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BATTEN FEEDER

FIELD OF THE INVENTION

This invention relates generally to devices configured to dispense and transport items.

BACKGROUND OF THE INVENTION

10 Battens are commonly used in the shipping industry as spacers under shipping units that allow a fork-lift or other lifting structure the ability to get between adjacent shipping units. Generally, battens are delivered in bundles, wherein each bundle contains about 144 individual battens, and each bundle may weigh in excess of 1000 lbs. The battens are manually inserted into a banding machine (or other similar machine) wherein the banding
15 machine inserts the batten under the shipping unit and then ties a metal or polymer band around both the shipping unit and batten. The current method of providing battens to a down line system such as a banding machine has several problems.

To meet production requirements, the banding machine needs to operate at a fairly steady pace. Consequently, the banding machine requires a consistent supply of battens.

20 Current operations do not have a means for consistently providing an adequate supply of battens. The current system relies upon physical labor to manually feed battens into the banding machine. This often does not result in a consistent supply of battens. Also, the physical labor is not only potentially debilitating by requiring awkward repetitive motion, but also requires multiple people to operate a single machine, which is an added cost.

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SUMMARY OF THE INVENTION

The present invention is a batten feeding system and method for automatically dispensing and transporting battens from a remote location to a banding machine or similar machine. The batten feeding system includes a batten dispensing system and a first

transport section configured to move battens into the batten dispensing system. Additionally, the system includes a second transports section configured to receive battens from the batten dispensing system. The system also includes a control system that is configured to control operation of at least one of a batten dispensing system, first transport section and second transport section.

An additional aspect includes a method of forming a bundled shipping unit. The method includes depositing a batten onto a transport section by operation of a controlled batten dispensing system and then controlling the transport section to transport the batten into a banding machine.

BRIEF DESCRIPTION OF THE DRAWINGS

The preferred and alternative embodiments of the present invention are described in detail below with reference to the following drawings.

FIGURE 1 is a system diagram of an aspect of the present invention;

FIGURE 2 is another system diagram of another aspect of the present invention;

FIGURE 3 is still another system diagram of another aspect of the present invention;

FIGURE 4 is side view of the batten feeding system made in accordance with the present invention;

FIGURE 5 is top view of the batten feeding system made in accordance with the present invention; and,

FIGURE 6 is an isolated view of the batten dispensing system according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention provides a system and method for automatically delivering battens to a down line system, such as a banding machine or the like. An embodiment of the invention includes a batten feeding system 20 including a transport section 22, batten dispensing system 24, control system 26 and down line system 28. Specific details of the system and method are described with more particularity below.

As best seen in FIGURES 2, 4 and 5, the transport section 22 is typically configured as a multi-part system, including a first transport section 30, a second transport section 32 and a third transport section 34. The first transport section 30, second transport section 32 and third transport section 34 may be formed as part of a complete integrated unit, for example, they may be attached to a single frame 62, as best shown in FIGURE 5. Alternatively, the respective units may include combinations of integrated units with independent units, as illustrated in FIGURE 4. For example, without limitation, the first transport section 30, second transport section 32 may share the same frame 62, while the third transport section 34 does not. It will be appreciated that other configurations may also be used without departing from the spirit and scope of the present invention.

The first transport section 30 is a staging area for the batten bundles 50 prior to their passage into the batten dispersing system 24. For simplicity purposes only the FIGURES only show a single batten bundle 50, however, the overall size of the first transport section 30 is not limited, and therefore any number of batten bundles 50 may be staged in the first transport section 30.

As depicted best in FIGURE 5, the first transport section 30 includes a pair of spaced apart idler chains 64 driven by a motive force, such as an electric, hydraulic, pneumatic, or combustion engine. Also or alternatively, the first transport section 30 may include a simple conveyer system such as a flat belt, walking floor or rollers (not shown). Conveyer systems are known in the art, and as such a detailed description is not necessary herein to comprehend the present invention. As the batten bundles 50 are typically still banded while in the first transport section 30, acceleration based instability within the batten bundles 50 is typically not an issue. Therefore, the unit supplying the motive force or the configuration for transferring the motive force to the batten bundles 50 may start or stop more abruptly than in the second transport section 32.

The second transport section 32 may be the same physical moving structure as the first transport section 30. For example, without limitation, the second transport section may include a simple conveyer system such as a flat belt, walking floor or rollers (not

shown). However, it will be appreciated that, as the batten bundles 50 are typically not banded when they are in the second transport section 32 therefore more care must be taken to prevent acceleration based instability within the batten bundles 50. Specifically, which ever structure is used, the control and operation of such a structure must be carefully controlled to prevent any excessive inertial problems with the freely stacked batten bundles 50. To this end, the idler chain arrangement discussed above has been found to be a desirable structure. It has been found that advancing the idler chain with a fluid actuated cylinder 66, either hydraulically or pneumatically cylinder has the desired control capabilities.

As best seen in FIGURE 4, the second transport section 32 may include a stabilizer bar 68. The stabilizer bar 68 is configured to provide support to the non-banded batten bundle 50 as they move through the second transport section 32 and into the batten dispensing unit 54. The stabilizer bar 68 may simply be a rigid member extending upwardly as shown in FIGURE 4. Alternatively, the stabilizer bar 68 may be configured to extend downwardly (not shown). A detailed discussion on the stabilizer bar 68 is not required to understand the present invention.

The third transport section 34 is typically a flat, belt-type conveyor. The third transport section 34 may be of any length as required by the relative location of the batten feeder system 20 and the down line system 28. As the distance between the batten feeder system 20 and the down line system 28 may be significant, the third transport section 34 will need to be designed to move the individual battens 52 at a relatively higher speed than either the first transport section 30 or second transport section 32.

FIGURE 3 illustrates the control system 26. The control system 26 includes a primary control unit 36 which is configured to be the overall control station for the operation of the invention. The primary control unit 36 is configured to communicate with the first transport section control unit 38, the second transport section control unit 40, the third transport section control unit 42, the batten dispensing control unit 44 and the down line system control unit 46. The communication may be electrical, hydraulic, optical,

pneumatic or other known communication methods. Where the communication is electrical, communication may include or be preformed by a processor or microprocessor (not shown) arranged to perform control operations. Any processor known in the art is acceptable, for example, without limitation, a Pentium® series processor available from Intel Corporation or the like. Alternatively, any control may be performed by electronic computer chip or manually. It will be appreciated by those skilled in the art that any variety of sensors, valves, switches or the like may be necessary to facilitate operation of the batten feeder system 20, and it is not necessary to describe there function herein.

The control system 26 may be set up in any variety of manners. For example, the control system may be set up where in the first transport section control unit 38, the second transport section control unit 40, the third transport section control unit 42, the batten dispensing control unit 44 and the down line system control unit 46, all cooperate together. By way of illustration only, if the banding machine uses a batten 52, all the other units are sent a signal that requests each unit to do its function. In this manner, the batten dispensing system 24 will dispense another batten 52, and the various transport sections may advance their positions. Alternatively, the control system 26 may be set up to control the various units in any other variety of ways. By way of another non-limiting example, the second transport section 32 may be configured to move forward on space for every 12 operations of the batten dispensing system 26. Similarly, the first transport section 30 may be configured to operate upon X number of actions of the second transport section 32. Additionally, the third transport section may be controlled to operate for a given amount of time with the amount of time being determined by belt speed and the distance to the down line system 28. Any such control arrangement is within the scope of those skilled in the art and therefore a more detailed description is not necessary herein to understand this system.

FIGURE 6 depicts the batten dispensing system 24. As discussed above, the battens 52 are brought into the batten dispensing system 24. A hammer 70 is configured to displace a batten 52 from the vertical column. The displaced batten 52a is moved from the

vertical column onto the third transport section 34, the hammer then returns to its initial position allowing the vertically stacked battens 52 to occupy the space vacated by the displaced batten 52a. As discussed above the operation of the hammer 70 is controlled by the control system 26.

5 In operation, bundled battens 50 are initially placed on the first transport section 30. The bundled battens 50 may be aligned by abutting the bundled battens against post 60 prior to advancing the bundled battens 50 toward the second transport section 32. As the bundled battens 50 enter the second transport section 32, any banding surrounding the bundled battens 50 may be removed and a stabilizer bar 68 may be used to steady the
10 battens 52. The battens 52 are then moved into the batten dispensing system 24 one column at a time. The batten dispensing system 24 is then controlled to dispense a single batten 52 at a time onto the third transport system 34. The third transport system 34 then carries the displaced batten 52a to a down line system 28. Those skilled in the art will appreciate that the down line system 28 may be a banding machine or other similar
15 machine wherein battens are employed.

 While the preferred embodiment of the invention has been illustrated and described, as noted above, many changes can be made without departing from the spirit and scope of the invention. Accordingly, the scope of the invention is not limited by the disclosure of the preferred embodiment. Instead, the invention should be determined
20 entirely by reference to the claims that follow.